

## CLAIMS

1. A glass substrate for a magnetic recording medium formed to have a disc shape and including ridge shaped textures extending along concentric circles on a main surface, the glass substrate being characterized in that:

the textures have a width  $W$  that is between 10 and 200 nm at a reference plane obtained by measuring a 10  $\mu\text{m}$  square range with an atomic force microscope, the textures have a height  $H$  that is between 2 and 10 nm, and the textures have a ratio ( $R_p/R_{\text{MS}}$ ) of a maximum mountain height with respect to a root mean square roughness that is less than or equal to 15.

2. The glass substrate for a magnetic recording medium according to claim 1, wherein the width  $W$  at the reference plane of the textures is between 10 and 20 nm.

3. The glass substrate for a magnetic recording medium according to claim 1 or 2, wherein the width  $W$  at the reference plane of the textures is between 10 and 20 nm, the height  $H$  of the textures is between 2 and 5 nm, and the ratio ( $R_p/R_{\text{MS}}$ ) of the maximum mountain height with respect to the root mean square roughness RMS of the textures is less than or equal to 3.

4. The glass substrate for a magnetic recording medium according to any one of claims 1 to 3, wherein when the textures are cut along a plane parallel to the main surface in the 10  $\mu\text{m}$  square measurement range of the atomic force microscope, the percentage of the area of the cut plane with respect to the entire area of the measurement range is defined as a bearing ratio (BR), the height of the

textures when the bearing ratio is 50% is defined as a reference height, and the height of the textures from the reference height in a plurality of bearing ratios is defined as a bearing height (BH), the difference between the bearing height (BH) when the bearing ratio (BR) is 0.01% and the bearing height (BH) when the bearing ratio (BR) is 0.4% is between 0.01 and 1.0 nm for the textures.

5. The glass substrate for a magnetic recording medium according to any one of claims 1 to 3, wherein when the textures are cut along a plane parallel to the main surface in the 10  $\mu\text{m}$  square measurement range of the atomic force microscope, the percentage of the area of the cut plane with respect to the entire area of the measurement range is defined as a bearing ratio (BR), the height of the textures when the bearing ratio is 50% is defined as a reference height, and the height of the textures from the reference height in a plurality of bearing ratios is defined as a bearing height (BH), the difference between the bearing height (BH) when the bearing ratio (BR) is 0.4% and the bearing height (BH) when the bearing ratio (BR) is 1.0% is between 0.15 and 0.20 nm for the textures.

6. The glass substrate for a magnetic recording medium according to any one of claims 1 to 3, wherein when the textures are cut along a plane parallel to the main surface in the 10  $\mu\text{m}$  square measurement range of the atomic force microscope, the percentage of the area of the cut plane with respect to the entire area of the measurement range is defined as a bearing ratio (BR), the height of the textures when the bearing ratio is 50% is defined as a reference height, and the height of the textures from the reference height in a plurality of bearing ratios is defined

as a bearing height (BH), the difference between the bearing height (BH) when the bearing ratio (BR) is 0.01% and the bearing height (BH) when the bearing ratio (BR) is 0.4% is between 0.2 and 0.7 nm, and the difference between the bearing height (BH) when the bearing ratio (BR) is 0.4% and the bearing height (BH) when the bearing ratio (BR) is 1.0% is between 0.17 and 0.20 nm for the textures.

7. The glass substrate for a magnetic recording medium according to any one of claims 1 to 3, wherein when the textures are cut along a plane parallel to the main surface in the 10  $\mu\text{m}$  square measurement range of the atomic force microscope, the percentage of the area of the cut plane with respect to the entire area of the measurement range is defined as a bearing ratio (BR), the height of the textures when the bearing ratio is 50% is defined as a reference height, and the height of the textures from the reference height in a plurality of bearing ratios is defined as a bearing height (BH), the difference between the bearing height (BH) when the bearing ratio (BR) is 0.4% and the bearing height (BH) when the bearing ratio (BR) is 1.0% is less than the difference between the bearing height (BH) when the bearing ratio (BR) is 1.0% and the bearing height (BH) when the bearing ratio (BR) is 15% for the textures.

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8. The glass substrate for a magnetic recording medium according to any one of claims 1 to 7, wherein an average depth D of depressions of the textures in the 10  $\mu\text{m}$  square measurement range of the atomic force microscope is less than or equal to 2 nm, and a ratio H/D of a height H with respect to the average depth D of the depressions of the textures is greater than or equal to 10.

9. The glass substrate for a magnetic recording medium according to any one of claims 1 to 8, wherein the textures include low frequency components, obtained in the  
5 10  $\mu\text{m}$  square measurement range of the atomic force microscope, and high frequency components, obtained in a 1  $\mu\text{m}$  square or 0.1  $\mu\text{m}$  square measurement range of the atomic force microscope, superimposed on the low frequency components, and being finer than the low frequency  
10 components, wherein the textures of the high frequency components have a width  $W'$  that is between 0.1 and 20 nm, and the textures of the high frequency components have a height  $H'$  that is between 0.1 and 1 nm.

15 10. The glass substrate for a magnetic recording medium according to claim 9, wherein the width  $W'$  of the textures of the high frequency components is between 1 and 5 nm, and the height  $H'$  of the textures of the high frequency components is between 0.3 and 0.8 nm.

20 11. The glass substrate for a magnetic recording medium according to any one of claims 1 to 10, wherein the textures in the 10  $\mu\text{m}$  square measurement range of the atomic force microscope has a maximum valley depth  $R_v$  of 10 nm or  
25 less.

12. The glass substrate for a magnetic recording medium according to any one of claims 1 to 7, wherein the ratio ( $H_{v1}/H_{c2}$ ) of a coercive force  $H_{c1}$  in a circumferential  
30 direction with respect to a coercive force  $H_{c2}$  in a radial direction is greater than 1.1 and less than or equal to 1.3.

13. The glass substrate for a magnetic recording

medium according to claim 1 or 2, wherein the ratio ( $R_p/R_{ms}$ ) of a maximum mountain height  $R_p$  with respect to a root mean square roughness RMS of the textures is less than or equal to 5.

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14. A method for manufacturing a glass substrate for a magnetic recording medium, the method including a disc machining process for machining a sheet of glass material into a disc shape, a polishing process for polishing a main surface of the disc-shaped glass substrate with a polishing member, a washing process for washing off residual polishing agent from the main surface of the glass substrate, and a texture formation process for forming textures on the main surface of the washed glass substrate, the method being characterized in that an arithmetic mean roughness  $R_a$  of the main surface of the washed glass substrate indicates a value of between 0.35 and 1.0 nm when a 10  $\mu\text{m}$  square range is measured with the atomic force microscope.

20 15. The method for manufacturing the glass substrate for a magnetic recording medium according to claim 13, wherein a chemical strengthening process for chemically strengthening the glass substrate is included before the texture formation process.